Cost Analysis of Electronics Recycling In North Carolina Communities

FACT SHEET

Background

As technology continues to advance, outdated electronics are becoming an increasing part of the waste stream. *Waste Age* reports that electronics, such as computers, monitors and printers, are typically replaced every two to four years. According to the National Safety Council, in 1998 approximately 20.6 million personal computers became obsolete in the United States. This number is predicted to increase to 315 million by the year 2004. With this in mind, electronics disposal is becoming an important issue for solid waste administrators.

One response to this growing concern is for local governments to initiate collection programs for discarded electronics. As with almost all recycling programs, the collection of electronics will entail some costs. These costs will depend on factors such as producer responsibility initiatives, the advent of advance disposal fees or other funding mechanisms, and the development of end-use markets. At the state level, advance disposal fees for electronics could be modeled after those for white goods and tires, thus providing an ongoing source of funds for locally-operated electronics recycling programs.

Before designing and implementing a local electronics recycling program, administrators should first determine any associated costs. Cost accounting is one technique that estimates the full cost of delivering services to citizens. By breaking down the total cost into distinct categories, hidden and often overlooked costs are extracted.

Methodology

This report is intended to determine the basic, additional costs of establishing and linking an electronics recycling program to an existing solid waste collection infrastructure. As a result, sunk costs such as land, existing buildings and major pieces of equipment like trucks are outside the scope of this report and therefore not included. However, these costs should be considered when local governments calculate the full cost of providing solid waste related services. The Environmental Protection Agency, as well as the N.C. Division of Pollution Prevention and Environmental Assistance, provide detailed spreadsheets to help administrators determine the full cost of implementing a new recycling program.

In North Carolina, six pilot electronics recycling programs were operating by summer 2001. Of this population set, three communities were chosen to reflect the different types of recycling methodologies. Each community was contacted and sent a letter of project intent along with a cost analysis spreadsheet. The sample set is as follows:

Iredell County – One-time electronics “take-back” event

Mecklenburg County – Ongoing collection of electronics at convenience centers

Town of Cary – Curbside electronics recycling on an as-needed basis

The group is a small sample size and was hand picked rather than randomly selected due to the heterogeneous qualities of the programs. These factors prevent results from being extrapolated to the population. However, respondents’ answers are valuable in that they reflect the additional costs associated with operating an electronics recycling program.

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As shown below, costs were broken down into three categories and their corresponding expenses to determine the true cost of operations.

Category 1: Salaries/Wages

A) Staff time to organize program

B) Staff time to train employees/site attendants/collectors

C) Event labor/on-site labor/curbside labor

Category 2: Capital Costs

A) Storage space

Category 3: Non-Capital Direct Costs

A) Advertising

B) Contract services/vendor charge

C) Supplies (pallets, shrinkwrap, etc.)

D) Hauling costs

E) Cost to recycle monitors

Not all expenses apply to each community and some expenses may be nested in other areas (i.e. hauling costs may be included in the vendor charge). In such cases, respondents were instructed to simply enter zero for that item.

Results:

	Collection Method		
	Iredell County One-Time "Take-Back" Event	**Mecklenburg County Ongoing Collection at Convenience Centers ***	**Town of Cary Curbside Recycling as Needed ****
Net Cost	$2,260	$4,900	$10,932.62
Tons of Material Recycled	11.92	60	9.94
Number of Units Recycled	Estimated 500	Not available	367 monitors
Number of Households Served	Estimated 100	210,000	29,797
Total Cost per Ton	$189.59	$81.67	$1,099.86
Total Cost per Unit	$4.52	Not available	$29.79
Total Cost per Household	$22.60	$0.02	$0.37

* Figures for Mecklenburg County reflect annual costs

** Figures for the Town of Cary are based on a seven-month period, from program initiation in November 2000 to June 2001

Several general observations can be made from the resulting data to determine the costs associated with electronics recycling. However, in some cases the data presented by the respondents was a best estimate, since not every community tracked each variable. For example, Iredell County did not count the number of units collected or the number of participants at their take-back event. This uncertainty affects the reliability of their total cost per unit and total cost per household figures. Similarly, Mecklenburg County did not track the number of units collected annually, while the Town of Cary only tracked the number of monitors received. In addition, Iredell County utilized volunteer labor, free advertising and donated supplies to minimize the cost of sponsoring the take-back event. As a result, most of their non-capital, direct costs were best estimates. Finally, the communities who sponsored ongoing collections only allowed households to participate in the program, while Iredell County opened its event to both residential and business customers. This expansion of eligible participants increased the potential for more material to be collected.

Observations

Program administration, which encompassed salaries and wages, proved to be the most expensive cost for each community. Iredell County spent $760, Mecklenburg County paid $3,800, and the Town of Cary spent $8,891 on wages for the planning and collection of electronics. Iredell County's direct cost for salaries was really $160 for staff time to organize the program. The additional $600 included in the original figure is the estimated cost of necessary labor to staff the event. However, Iredell did not pay this amount since they used volunteer event labor.

Interestingly, even though Mecklenburg County and the Town of Cary both operate ongoing programs, the administrative costs for Cary are more than double those for Mecklenburg. Salaries for curbside labor to collect electronics contribute to this cost difference. Electronics recycling comprises 26 percent of Cary laborers' time, while on-site attendants in Mecklenburg only spend 2 percent of their time on electronics recycling. This curbside labor effort by Cary, although more costly, translated into 367 monitors collected in a seven month period, or 52 monitors collected per month.

Budget analysts usually consider capital costs, such as land, buildings and equipment, to be sunk costs. Since these costs are part of the initial recycling infrastructure, they were not included in this analysis. However, storage space for electronics was included for those communities that might have to rent additional space. Mecklenburg County was the only community to pay a nominal storage fee of $100 per year. The Town of Cary utilized existing space, while Iredell County did not have this storage concern when sponsoring its one-day take-back event.

Non-capital direct costs, for advertising, supplies and vendor/contract services, seemed to be unique for each community. These expenses ranged from $1,000 in Mecklenburg County to $2,041 in the Town of Cary. Costs for advertising and supplies, at $500 each, made up the non-capital expenses for Mecklenburg. In contrast, the Town of Cary paid little for advertising ($206) since local newspapers like The News & Observer and The Cary News provided free coverage of the program. However, Cary did incur an additional expense of $1,835 to recycle the computer monitors through Chatham Salvage. This fee significantly increased its overall direct costs. Iredell County's non-capital direct expenses were based on best estimates of what services typically should cost. The recycling coordinator estimated that $1,500 would have been spent on advertising, supplies and hauling costs had these services not been rendered at no charge.

When examining the total net costs of operating various electronics recycling programs, the one-time take-back event was the least expensive. As expected, curbside collection was the most costly method of electronics recycling. However, the administrative costs of both ongoing collection programs will most likely be reduced in future years since the planning and implementation phase of the programs are now over, leaving only salaries for laborers to be included in the cost analysis.

Mecklenburg County received 60 tons of material, the most tonnage collected out of the three communities. Cary reported that 9.94 tons were accumulated in a seven-month period. Extrapolating this figure to a twelve-month period yields over 17 tons of electronic material collected per year. This figure exceeds the amount generated at Iredell County's one-day event.

As a result of the tonnage collected and associated net costs, the cost per ton for electronics recycling is lowest for Mecklenburg County and highest for the Town of Cary. Therefore, it seems that Mecklenburg has the most efficient (lowest cost per ton) and effective (most tons collected) electronics recycling program.

It is difficult to analyze the recycling cost per unit and cost per household for these communities because of missing data and figures that were based on estimates. However, a comparison can be made between Mecklenburg County and the Town of Cary concerning total cost per household. Ongoing collection at convenience centers is significantly less expensive per household than curbside collection ($0.02 per household versus $0.37 per household). It should be pointed out, however, that Cary offers a higher degree of service to its citizens.

Conclusion

In general, the methodology of cost accounting can provide key information needed by managers for conducting their operations and planning future programs. The main advantage of this type of analysis is the exposure of true program costs. By calculating the total net cost and then examining it in terms of tons recycled, number of units recycled, and number of households served, solid waste administrators can evaluate their program and compare costs to communities with similar infrastructures. The cost analysis of these three North Carolina electronic recycling infrastructures provides managers with data to determine program popularity and overall efficiency.

The North Carolina Division of Pollution Prevention and Environmental Assistance provides free, non-regulatory technical assistance and education on methods to eliminate, reduce, or recycle wastes before they become pollutants or require disposal. Telephone DPPEA at (919) 715-6500 or (800) 763-0136 for assistance with issues in this fact sheet or any of your waste reduction concerns.

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